

Space News

ROUNDDUP!

VOL. 2, NO. 3

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

NOVEMBER 28, 1962

Gilruth Names Williams, Elms Deputy Directors

Grumman Negotiations Proceeding As Planned

Negotiations with Grumman Aircraft of Bethpage, N. Y. on the \$350 million contract for the lunar excursion module are proceeding on schedule, according to LEM Project Officer William F. Rector.

Resident manager for the program at the Grumman plant will be Jack Small, Rector said, and a personnel task force to



William F. Rector

work with him will be announced in the next few months, probably around the first of the year.

Rector has been with MSC since March 1 of this year, and has been "LEM oriented" in his own words, "since April."

He began as technical assistant to C. C. Johnson, chief of the Command and Service Module Office of Apollo, and was assigned responsibility for research and development and industry studies of the lunar excursion module. Rector wrote the work statement which went to industry prior to submission of bids, helped conduct the bidders briefing and evaluation, and is heading the MSC contract negotiating team now working with Grumman.

His duties will include technical direction to the contractor and responsibility for seeing that Project Office efforts on the LEM are coordinated.

Rector received his B. S. degree in mechanical engineering with an option in aeronautical engineering from the University of California in Berkeley in June of 1956.

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Walter C. Williams



J. C. Elms

MSC Personnel Get Awards, Present Papers At ARS Meet

An estimated 6,000 of the nation's leading space scientists and engineers were brought up to date on the most significant and advanced work being done in the rocket, missile and space flight field at the annual meeting of the American Rocket Society November 13-16.

A number of awards presented at the meeting included the Robert H. Goddard Award, highest tribute of the society, which went to Dr. Robert R. Gilruth, director of MSC, for general eminence in the field of rocket engineering and space flight. MSC Associate Director Walter C. Williams was made a Fellow Member of the Society, an honor granted annually to one tenth of one per cent of the membership. Astronaut John Glenn, first American to orbit the earth, received the Society's Astronautic Award for contributions to the advancement of space flight.

A Space Flight Exposition held in conjunction with the meeting featured exhibits from more than 100 aerospace companies and government agencies. Manned Spacecraft Center contributed an exhibit inside the Pan Pacific Auditorium building and a mock-up of the Apollo spacecraft command and service modules, complete with escape tower, was positioned in front of the auditorium.

Several MSC employees contributed papers which were presented at the meeting. Dr. George B. Smith, Harold J. McMann and Larry E. Bell, all of Life Systems Division, were co-authors with six others from the USAF School of Aerospace Medicine on a paper entitled "Bioengineering Experiments in the SAM Space Cabin

Simulator."

Thomas F. Gibson of Spacecraft Research Division presented a paper entitled "Application of the Matched Conic Model in the Study of Circum-lunar Trajectories."

Dr. Charles A. Berry presented a paper entitled "Problems of Astronaut Selection."

A radio signal transmitted 16 million miles through space from the Venus-bound Mariner spacecraft officially opened the meeting. The signal was broad-

(Continued on Page 2)

Ten Firms Invited To Submit Bids On Control Center

NASA has invited 10 industrial firms to submit bids by December 7 for a contract to build the integrated mission control center at Clear Lake and to integrate ground operational support systems to be used in Apollo and the rendezvous phases of Gemini.

Firms included in the invitation are Bendix Radio, General Electric, Hughes Aircraft, IBM, International Telephone and Telegraph, Lockheed, Philco, RCA, Raytheon and Space Technology Laboratories, Inc.

Potential subcontractors were urged to contact these firms, the controls systems procurement office at MSC or the NASA headquarters office of

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Williams To Have Additional Title In Holmes' Office

Manned Spacecraft Center Director Dr. Robert R. Gilruth named two deputies Wednesday to head development and operational activities in NASA's manned space-flight programs.

Walter C. Williams, former MSC associate director, becomes deputy director for mission requirements and flight operations. Concurrently, Williams was named director of flight operations in NASA's Office of Manned Space Flight in Washington, D. C. reporting directly to D. Brainerd Holmes. In this capacity, he will have complete mission authority during flight tests of Mercury, Gemini and Apollo.

At the same time, J. C. Elms, 46, of Los Angeles, Calif., joins NASA as MSC deputy director for development and programs, charged with primary management responsibility for spacecraft development projects.

The appointments and carrying salaries of \$21,000 each are effective January 1.

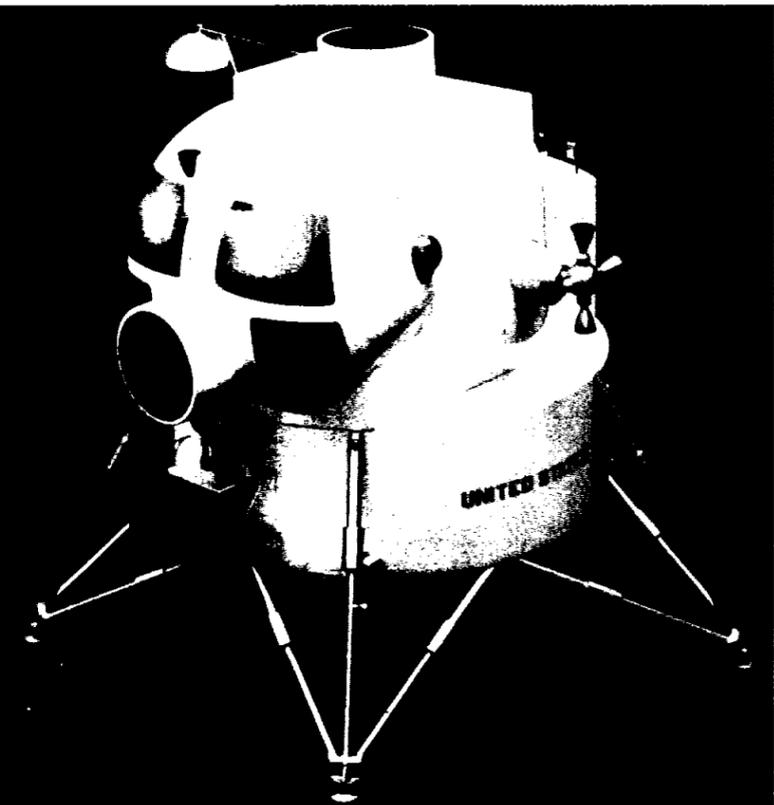
Williams, 43, who has been with NASA and its predecessor agency, NACA, for 22 years, first achieved fame as director of the "X" series of airplanes at NASA's Flight Research Center at Edwards, Calif. For his role in Project Mercury, that of operations director, he has received national and international honor and acclaim. He is a native of New Orleans, La., and a graduate of Louisiana State University where he received a B. S. in Engineering in 1939.

In his new role, Williams will assume primary responsibility for mission requirements, field test programs and flight operations.

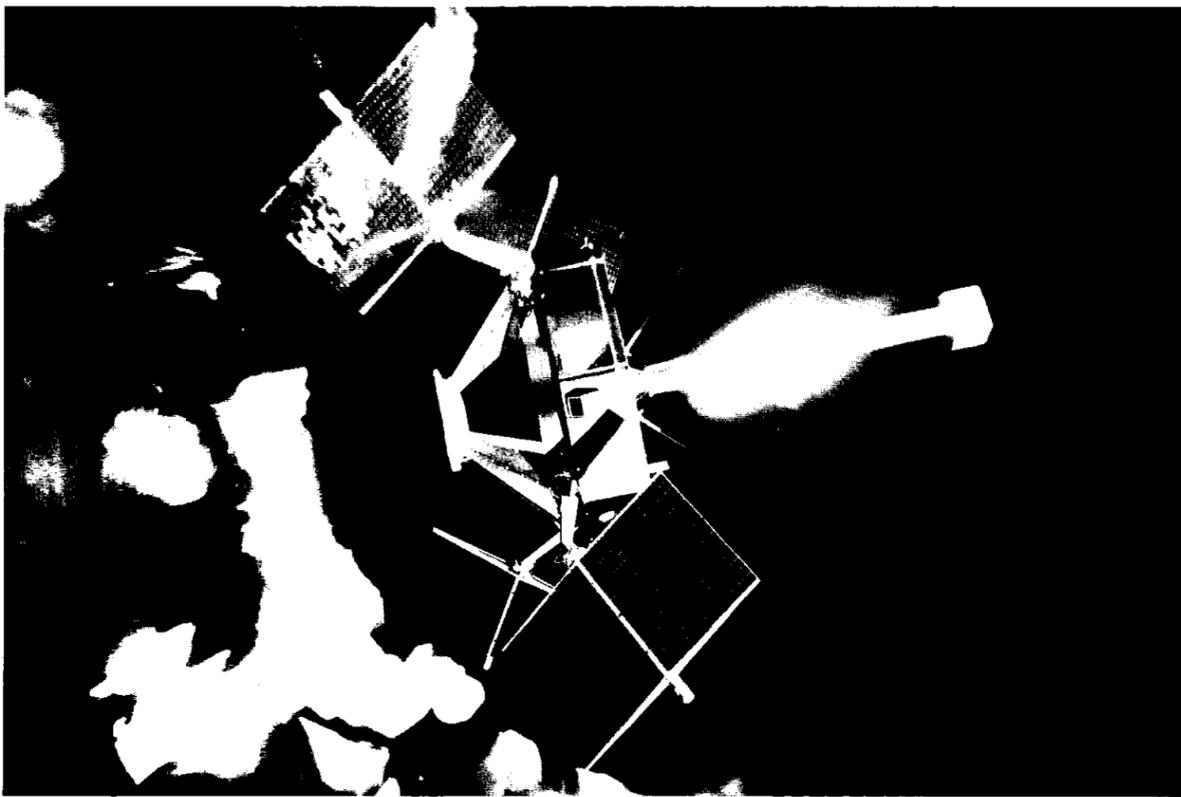
He will continue to serve as MSC representative in all negotiations with the Department of Defense for DoD support of NASA's manned flight missions.

Elms, who has been director of electronics for Aeronautics Division of the Ford Motor Company at Newport Beach, Calif., brings to NASA more than 15 years of top industrial development man-

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A SCALE MODEL of Grumman Aircraft Engineering Company's proposed lunar excursion module (LEM). This is the first released photograph of the model which Grumman submitted to NASA in their bid for the 350 million dollar contract. It represents an early conception and will undoubtedly undergo many changes, according to LEM Project Officer William Rector.



THIS EXPLORER SATELLITE 53B was fired into orbit from Cape Canaveral Oct. 27 to study the artificial radiation belt caused by the nuclear explosion of July 9. It now circles the earth in a highly elliptical, or "eccentric," orbit with an apogee of 10,760 miles and a perigee of 193.7 miles. Reception of information is good and all systems are performing satisfactorily. The satellite, which is Explorer 15, will probably stay in orbit for a year or more.

Messing Named Resident Manager At White Sands

Wesley E. Messing of Apollo Project Office has been named MSC resident manager at White Sands Missile Range, effective Friday. He has been acting resident manager since last July.

Messing will serve as a focal point of contact for MSC activities and provide the coordination needed for the conduct of MSC test programs at that site. He will report to the Apollo Project Office Manager Charles W. Frick.

Robert W. Cantwell will become assistant manager for administration at the resident manager's office at White Sands. His function is to establish and operate all administrative functions within the scope of the assigned responsibility. He will report to Assistant Director of Administration Wesley Hjernevik.

Messing received his B. S. degree in mechanical engineering from the University of Cincinnati and served with NACA from 1942 to 1954.

He returned to government service in 1958 as an aeronautical engineer with the NASA

Flight Research Center at Edwards, Calif. He transferred to MSC in January of this year and has been serving as acting MSC resident manager at White Sands since July.

Cantwell joined MSC in August from the Air Force Systems Command where he had been in supervisory contract administration on the Atlas "F" Program. He was educated in law and has spent 25 years in air transport and aviation manufacturing.

Beyond

(Continued from Page 8)

tory of very high performance could be designed to carry forward satellite astronomy," he said. Dryden said he expected to see constant research focussed on synchronous satellites, although he did not say at what point emphasis would shift from lower altitude types.

Dryden forecast that the next major advances in propulsion would come from nuclear applications. He said solid fuels offer many operational advantages over liquid-fueled rockets and will find increasing application. "I personally expect to see increasing use of solid propellants," but the big solid motors probably will follow, rather than precede nuclear rocket development, Dryden said. The NASA official also stated that from the studies he has seen of recoverable booster and airbreathing first stage concepts, he does not think such developments will "pay their way at present planned levels of space activity."

ARS Meet

(Continued from page 1)

cast for 30 seconds over the auditorium public address system.

Displays representing a cross section of the astronautics industry were open to the public.

On exhibit were models of the lunar spacecraft Ranger and Surveyor, communications satellites Telstar and Syncom; scientific satellite OGO (Orbiting Geophysical Observatory); Aries, an orbiting manned space laboratory; a 22 foot model of the military space booster Titan III (Titan II is scheduled for use in the Gemini program); and a model of the Saturn C-1, which underwent a third successful first-stage test at Cape Canaveral recently.

NASA-University Conference On Space Held In Chicago

The National Aeronautics and Space Administration-University Conference on the Science and Technology of Space Exploration was held in Chicago Nov. 1-3.

NASA officials, including several from Manned Spacecraft Center, and more than 1200 educators from 300 colleges and universities studied the relationship between NASA and educational institutions in meeting national space goals.

Major goals of the conference, according to NASA Administrator James E. Webb, were:

- To inform university administrators of the scope, magnitude, and importance of the space program;
- Provide faculty members with an authoritative and up-to-date review of space science and technology;
- Emphasize and outline the growing need for better-trained students and higher-caliber research, and
- Motivate universities to take more interest in the upgrading of faculties, curricula and facilities to better meet national goals in space exploration.

Dr. Hugh L. Dryden, NASA deputy administrator, reminded the conference that "the exploration of space is a social force which is rocking the world."

Universities cannot ignore this force, he said, and must recognize their inherent responsibility "entirely apart from any thought of governmental support to contribute to this major task.

"Like the small nations of the world which may never launch a satellite, but which must find ways of participation in space exploration, the smallest university must contribute sources and active interest."

Another point, repeatedly underscored during the conference, was Dryden's statement:

"The university alone is the producer of new engineers and scientists."

"The government laboratory, industry, the research foundation, all are users of creative and talented men without reproducing this vital national resource," Dryden warned.

Under NASA grants, 10 universities currently are offering fellowship aid to promising science and technology students in smaller colleges who might otherwise not have a chance to pursue graduate studies, because their campuses offer no Ph.D. work.

Gilruth Names

(Continued from Page 1)

agement experience. A former executive vice president of Avco's Crosley Division, Elms holds a Bachelor of Science degree in physics from California Institute of Technology and a Master of Arts degree in physics from the University of California at Los Angeles.

He has headed a variety of research and engineering projects in the aviation, space and electronics fields at North American Inc., the Martin Company, and Consolidated Vultee Aviation Corp.

In his new job, Elms will be responsible for all MSC development projects including cost control, scheduling, engineering, supervision and administrative support.

Steering Engine Is Test Fired At Azusa Plant

Several successful firings of an Apollo development engine were recently accomplished by Aerojet-General Corporation at Azusa, California.

When it's operational, this engine will bear the brunt of the load in steering the Apollo spacecraft toward the moon, placing it into a lunar orbit, ejecting it from this orbit, and bringing the crew home safely. To perform this difficult mission will require an engine capable of many stops and restarts, near-perfect reliability and long burning duration.



AFTER 48 HOURS in a Gemini spacecraft mockup, Harold Morris (left) and Dr. Norman Roth (center) of Whirlpool Corporation are questioned by Joseph Schmidt, crew equipment specialist with Crew Systems Division, on the operation of their company's food and waste management equipment. During the period both men consumed a variety of dehydrated and concentrated foods that are under study for possible use during Gemini spaceflights. The "menu" included crabmeat, chicken and rice, curried rice, ham casserole, beef cubes, sugar corn pops, apple sauce, caramel pudding and blended fruit juice. Dr. Roth wore a pressure suit during the test although it was not pressurized. Morris wore flight coveralls.

Telecommunications Handles Phone, Teletype, Radio

A wag once said something to the effect that the three fastest means of communication were telephone, teletype and tell a woman. The first two parts of that statement, at least, are true, and at Manned Spacecraft Center they are the province of Telecommunications, a branch of Administrative Services.

Providing the Center with communications support in all areas except actual flight operations, Telecommunications has a half dozen separate jobs.

They include responsibility for the telephone network linking the 14 MSC sites, and special "tie lines" all over the U. S. The telephone directory which comes out each month to take care of the rapidly-expanding, constantly changing system is compiled by Telecommunications, which also operates the dial information service.

Teletype service, regular TWX dial system and special lines as well as cryptographic (code) teletype is handled by Telecommunications. Facsimile machines, which operate like wirephoto senders and transmit photographs or circuit diagrams, come under this branch. So does the mobile radio used by the security cars and the classified and unclassified frequencies used in checking out spacecraft functions here at the Center.

The man in charge of the branch and its varied activities is Thomas W. Ullrich.

Demonstrating the complexities of the inter-site telephone system alone, Ullrich pointed out that MSC's main switchboard handles 700 stations (extensions) 300 of them in the HPC complex and the rest in six "detached stations." If your telephone extension number begins with 3, it is working from the central switchboard in HPC.

Six other buildings are "satellite stations" with their own dialing equipment. There

are 1,520 extensions presently in operation in the satellite system, some 800 of them at Ellington alone.

That makes 2,220 extensions in use at MSC, so the next time you get a busy signal after dialing one or two numbers don't be impatient. It means that all incoming circuits to that number series are tied up at the moment.

Incoming calls through MSC's WA 8-2811 number are handled by 60 trunk lines running into the HPC switchboard from the Houston's Southwestern Bell System. (Bell installs and maintains the entire system under contract to MSC.)

In addition, MSC maintains four leased long line voice circuits to NASA Headquarters in Washington, four to Cape Canaveral, two to North American Aircraft in Downey, Calif. and one each to Western Operations Office, Marshall Space Flight Center in Huntsville, Ala. and McDonnell Aircraft in St. Louis. A code number, such as "888," gives direct dialing service to these installations.

Both Washington Headquarters and Goddard Space Flight Center have leased incoming lines to MSC in Houston, also.

Something new has been added to the telephone situation lately with the addition of four Wide Area Telephone Service (WATS) circuits. This means that MSC pays a set toll rate for circuits which will reach 38 states. All calls using these circuits are included in the set rate. "If the lines are used enough," says Ullrich, "they could save us a considerable amount of money. We are trying the system to see how it works out."

Among future telephone plans at MSC is the fast, highly automatic CENTREX switchboard which will be in operation at the new site at Clear Lake. Persons calling into the Center, for instance, will be

able to dial three digits, such as HU-1, and the extension number they want and get their party direct, without going through a live operator.

Less well known than the telephone setup at MSC is the Center's teletype facilities. Teletype service is handled through the Telecommunications office in the basement of the headquarters building, where TWX teletypes can reach any of 52,000 TWX subscribers all over the world by simply dialing a number. An automatic device "answers" incoming teletype calls by turning on the machine and typing out "This is Houston—MSC."

Teletype messages are sent by pre-punched tapes, which run the machine at 100 words a minute and avoid tying up teletype lines for any longer than necessary.

Telecommunications handles two Bell System TWX circuits and a Western Union "drop" to Houston, for those firms or individuals who do not subscribe to the TWX system.

In addition, there are four special leased circuits — to Western Operations Office; Philco's western office at Palo Alto, California; Cape Canaveral; and Marshall Space Flight Center in Huntsville.

Whenever possible, Marshall acts as a relay for east-bound teletype traffic, using the leased wires, and Western Operations Office does the same for west-bound traffic. Washington Headquarters often relays traffic for Western Operations through MSC. "Wherever the message is going, we always take the cheapest route possible for teletype traffic," Ullrich explained.

Three TWX machines are installed elsewhere in the Center for special users. The Data Computation Division uses one for transmitting punch-card data to MIT, and two others in Stahl-Myers are used for traffic to Philco's Western Development office and to Goddard Space Flight Center only.

In addition to "regular" tele-

type, there are also three circuits set up for cryptographic, or code, transmission of classified matter. Cryptographic lines are authorized through the National Security Agency, and equipped with an automatic scrambler on the sending end and an "unscrambler" on the other. The scrambler breaks the message into five-element groups of letters and figures which read like gobbledygook. They are unscrambled on the other end and come in on the receiving printer making sense again.

Telecommunications also deals with radio. MSC is using about 20 unclassified frequencies at present, assigned to the Center by the FCC on either a semi permanent basis or for as little as a month or two. They are used in checking out spacecraft components. The Center's Security Division also uses such a frequency for car-to-car communication. In addition, there are a number of classified frequencies in use for transmission of confidential material.



TELETYPE OPERATORS punch the tape which will send a message to any one of 52,000 TWX stations at the rate of 100 words a minute. Above are Robert Reaves, Jr. and Wanda Carter.



THE MSC TELEPHONE DIRECTORY is re-issued every month to take care of the rapid number changes caused by expansion. Here Corinne Stoneking, one of three girls who work full time to keep the directory up to date, takes some information for the next directory.



SWITCHBOARD OPERATORS at MSC's main switchboard in the HPC Building put a smile in their voices as they handle incoming calls from 60 trunk lines and 700 extensions.

Launch Operations Center At Cape Canaveral Is 'Sho



AN AERIAL VIEW of the special assembly building for the Saturn C-1 shows also Hangar 5 at right. Hangar 5 houses the present Mercury astronaut quarters and is the point from which each pilot begins his trip to the pad on launch days.



LAUNCH OPERATIONS CENTER'S E and L Building, also shown in the aerial photo above, occupies a central position in the shop area.

A bee-hive of activity might describe NASA's Launch Operations Center at Cape Canaveral—if the bees were a hundred or so feet tall with a buzz that rattled windows.

Sprawling along miles of Florida's sandy beach flats, LOC is the place where years of effort, months of preparation and hours of countdown reach final fruition in the heart-stopping seconds of a launching.

It is the "shooting end" of NASA, responsible for the integration, checkout, and launch of NASA space vehicles at Cape Canaveral. The only NASA launch programs not under LOC supervision are the Mercury-Atlas, directed by MSC, and the Delta Launch Vehicle, which is supervised by Goddard Space Flight Center in Greenbelt, Md.

Speaking of "LOC" still comes hard for some MSC personnel, who catch themselves talking of "LOD" out of long habit. Until early this year, Launch Operations Center was Launch Operations

Directorate, a division of Marshall Space Flight Center.

Now a full-fledged NASA field center, LOC is directed by Dr. Kurt Debus, a veteran of more than 600 launchings, who reports directly to D. Brainerd Holmes, head of NASA's Office of Manned Space Flight in Washington.

Dr. Debus himself has participated in more than 600 research and development missile launchings in a distinguished career that began at the German Rocket Development Center at Peenemuende. He came to the United States at the close of World War II with Dr. Wernher von Braun and 100 other German scientists to work with the Army rocket program. The group was later transferred to Huntsville, Alabama, with the Army Ballistic Missile Program, and Dr. Debus received his first assignment at Cape Canaveral in 1952. He, like the rest of the original group, is a United States citizen.

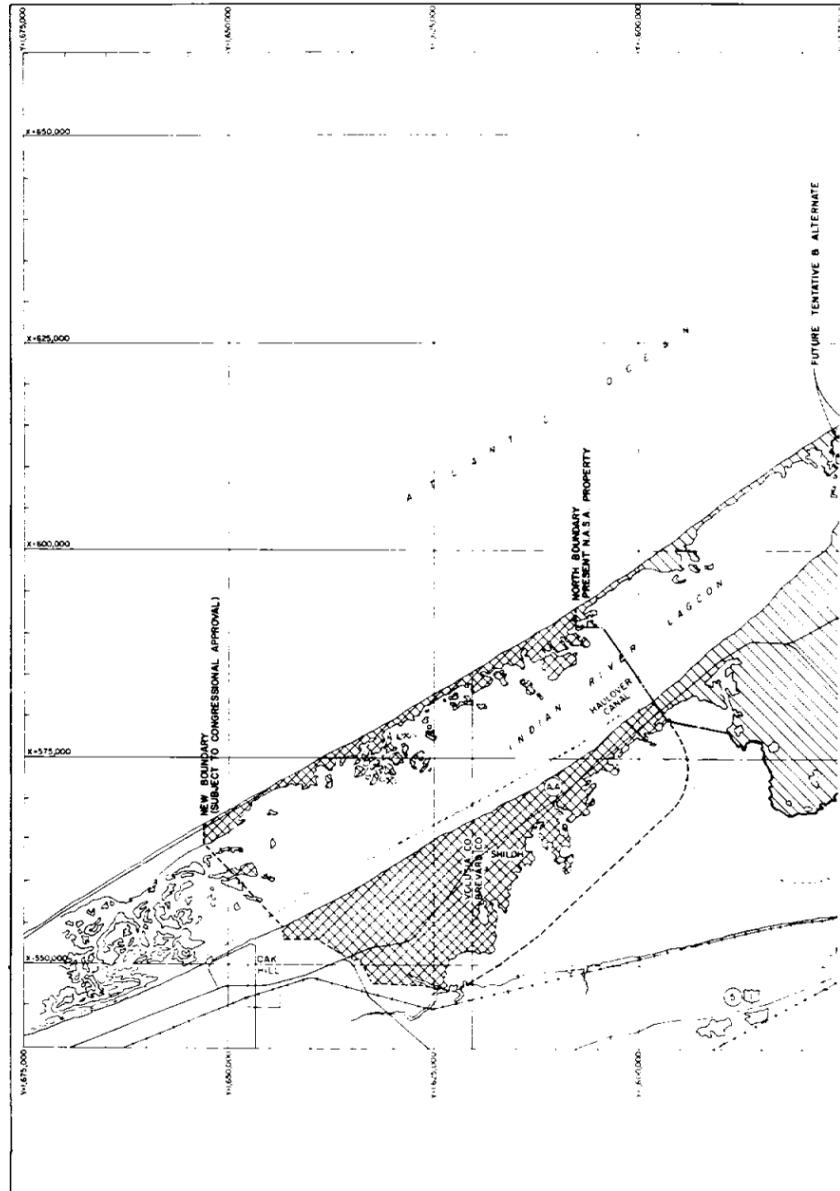
Four large launch complexes and their associated electronics and optical tracking equipment

are assigned to LOC. They are Complex 26 for Redstone vehicles, 56 for Jupiter, 36 for Centaur, and 34 for Saturn C-1. Now under construction are Complex 37, which will contain two Saturn pads, and an additional Centaur launch pad, Complex 36-B.

A Jupiter-C launched Explorer 1, the first successful U. S. satellite January 31, 1958. (Explorer 7 was launched by the Juno 2, a four-stage modified Jupiter which also launched Pioneers 3 and 4.) Delta is used for launching of scientific satellites. The Centaur is the first liquid hydrogen—liquid oxygen engine to be used in planetary and interplanetary missions.

In addition, LOC and the Air Force Systems Command have joint use of Complex 12 for Atlas-Agena B, and Complex 17, where NASA's reliable Delta vehicle is launched from Pad A.

[Assigned to Manned Spacecraft Center's Mercury-Atlas program is Complex 14, used for Atlas launchings, including the orbital flights of Astronauts



NASA'S MANNED LUNAR LANDING launch area, about 95,000 acres will be used as the launching site for astronaut flights to the moon plexes 34 and 37 for the 1.5 million pound thrust Saturn C-1, three consisting of a vertical assembly building and three launch sites for the Apollo spacecraft to the moon. LOC is directing construction of

Glenn, Carpenter and Schirra. Complex 5 was used for the Mercury-Redstone launches, the sub-orbital flights of Astronauts Shepard and Grissom. MSC also has Complex 19, one of three which will be used for launching the Titan-powered Gemini two-man spacecraft.]

In addition to the four launch complexes now under its control, LOC is charged also with planning and developing NASA launch sites for the future advanced Saturn (C-5) and the giant Nova vehicles in the 95,000 acre area being acquired northwest of the present Cape facility.

The largest launch complex presently in full operation at the Cape is for launching the 1.5 million pound thrust Saturn C-1 vehicle. This is Complex 34, from which the third highly successful developmental flight of the Saturn C-1 first stage with a dummy second stage was launched November 16. The first two such flights, in October of 1961 and last April, were equally successful. After the fourth Saturn launch, the complex will be modified to handle two-stage Saturn flights.

Total cost of the complex including the modification will be 43.7 million dollars.

Main features of the 45-acre facility—the largest known launching site in the world and the first built expressly for the

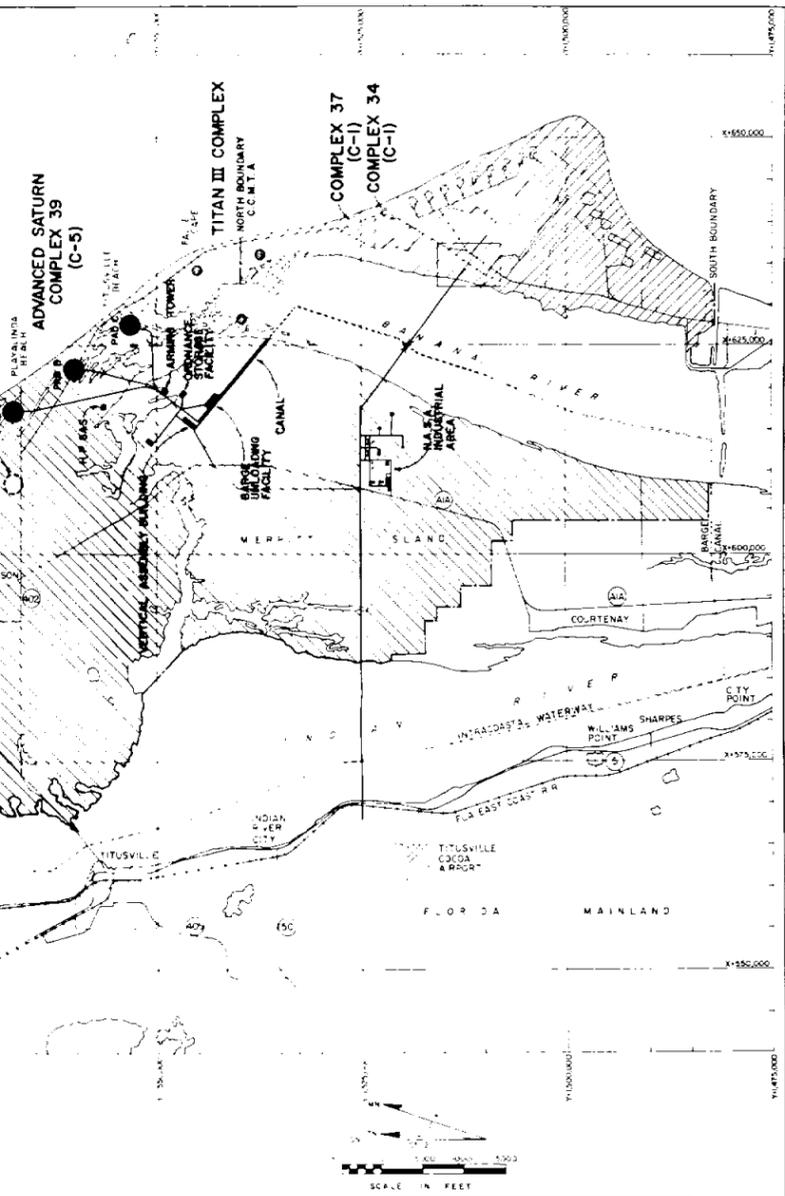
peaceful exploration of space—are the launch pedestal, umbilical tower, blockhouse and propellant facilities.

The launch pedestal is a large steel and concrete platform from which the space vehicle is launched, constructed on heavily compacted soil and equipped with a huge flame deflector. Erected next to the pedestal, the umbilical tower maintains the link between the space vehicle and ground equipment until a few seconds after the first motion of lift-off.

The launch service tower is used to assemble, service and shelter the vehicle. The seven-story high structure rolls up to and away from the Saturn by its own power, carried on 48 wheels which move along a railway. At launch time the service tower or gantry is moved 600 feet back from the Saturn, the minimum distance necessary to protect the service tower from the explosive power of the vehicle propellants should an explosion occur at launch time.

The blockhouse houses the launch control center and is the complex nerve center that contain the equipment required to check out and launch a Saturn. Fueling facilities consist of propellant storage tanks and pipes connecting them to the pedestal. Camera stations surrounding the site

Plotting End' Of NASA's Space Exploration, Activities



North and west of the present Cape Canaveral Missile Test Annex, are the end of the present decade. Launch sites shown are Titan III pads that will be used by the Air Force, and Complex 39, the 7.5 million pound thrust Advanced Saturn (C-5) that will launch new sites and will conduct the launches.

furnish automated remote photographic coverage of the launch.

The huge new Launch Complex 37, double the size of any facility now in operation, is under construction on a 120 acre tract at the north end of the Cape. With two pads, Complex 37 will cost 61.2 million dollars and be capable of six Saturn launchings per year when it is completed in June of 1963.

Saturn C-1's topped with boiler plate Apollo capsules will be flown from these pads. Construction on Pad B began last September and is nearing completion. Ground support equipment installation is underway and the pad is scheduled for use by the middle of next year. The fifth Saturn, the first with two live stages, will fly from Pad B.

Pad A, funded separately, was begun last April and is scheduled to be completed in June of 1963.

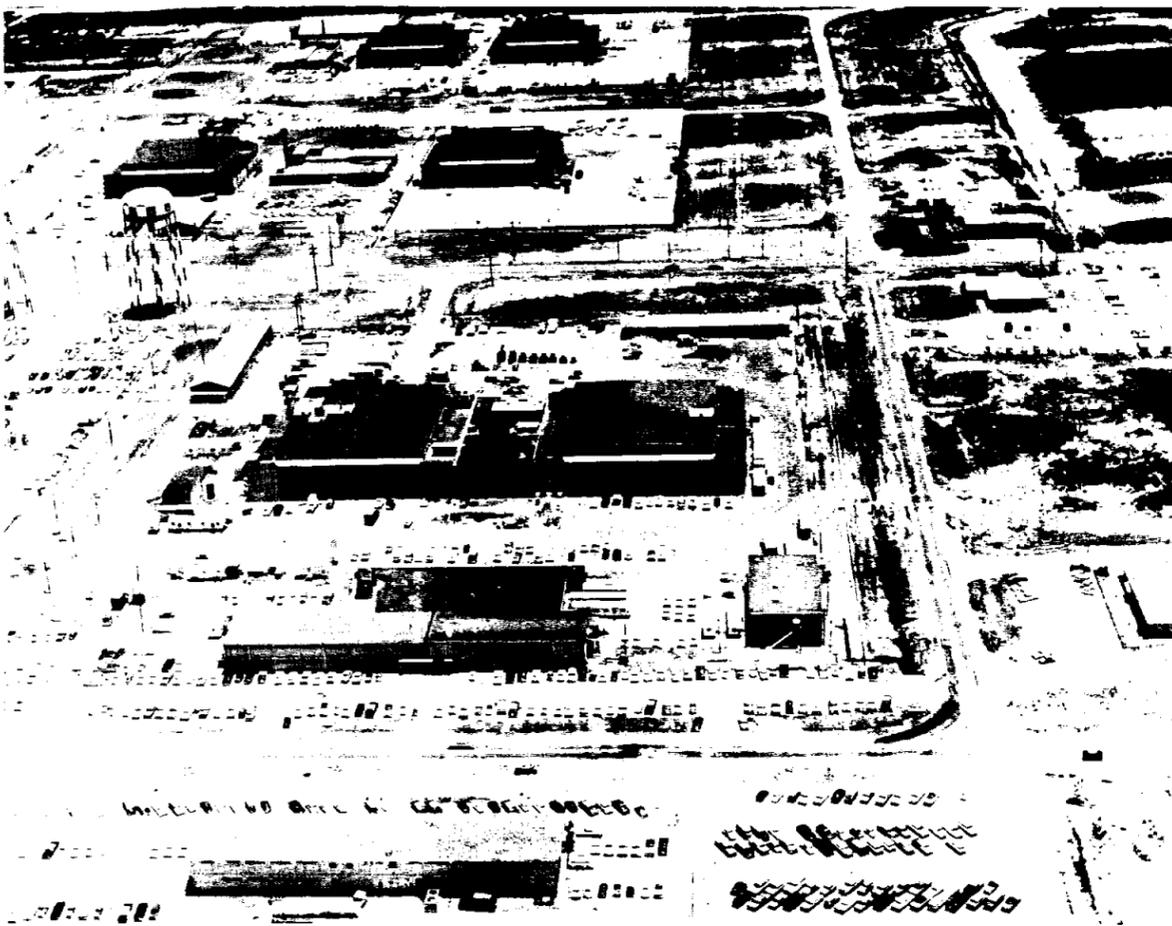
The pads will have individual automatic ground control sites (AGC), launch pedestals and umbilical towers. Structures common to both sites will include the launch control

center, operations support building, propellant storage and transfer facilities and a mobile self-propelled launch service structure riding on 1200 feet of steel rails between the two launch stands. The massive 300-foot high service structure, extendible to 330 feet, will probably be the largest movable structure in the world. All levels will be serviced by two high-speed elevators.

In October of 1961, NASA chose the Cape Canaveral area as the launch site for Advanced (C-5) Saturn and Nova class vehicles in the lunar landing program. Since then about 95,000 acres north and west of the present Air Force Missile Test Center have been or are being acquired under the supervision of the U. S. Army Corps of Engineers.

Originally, 72,000 acres were to be acquired for the new area and NASA was given rights by the State of Florida to 14,200 acres of bottom land contiguous to the area.

Acquisition of this land is scheduled for completion by next July. The estimated cost is 55 million dollars.



AN AERIAL PHOTO of the central shop facility and Area 42. The building in left center foreground is MSC's E & O Building at the Cape. LOC Headquarters is directly across the street.



Dr. Kurt Debus

Congress has authorized the acquisition of an additional 14,800 acres north of the present acquisition area at a cost of 32 million dollars, with July 1964 as the target date for completion.

First launch facility for the new area will be Complex 39, for the Advanced Saturn. A new concept of launch preparations will be used, featuring a giant 48-story two block long vertical assembly building and at least three launch pads located several miles away.

According to this concept, the huge 350 foot Saturn C-5 will be erected, mated to its Apollo spacecraft and completely checked out in the vertical assembly building. Then a 2500 ton crawler vehicle will lift the rocket and its 400 foot umbilical tower and carry it two miles over specially built roadways to its launch pad.

Design criteria are being developed for such long lead



COMPLEX 34 at Cape Canaveral was the scene of the third successful launching of the Saturn C-1 Nov. 16. The first stage carried dummy second and third stages loaded with 95 tons of water to an altitude of 104 miles, impacting 270 miles down-range. This picture shows SA-3 ready for countdown.

time items in the complex as the assembly building, launcher and crawler transportation systems. For fiscal year 1963, 173 million dollars was authorized for this work.

Early land preparation is underway at the site. The first building to be erected will be an Apollo operations and checkout facility now under design. Engineers announced earlier this month that the first structure to be built on Merritt Island in the newly acquired expansion will be started in February, with bids opened Jan. 3.

The first structure is a \$12

million, 300,000 square foot structure with portions six stories tall which will become primary headquarters for the NASA lunar landing program. It will house administrative facilities, quarters for the astronauts, an auditorium and cafeteria, service areas and a large open-space assembly area. The checkout and assembly area for the spacecraft will include the six-story portion of the building, 104 feet high. The test section of the building is to be completed by the end of November, 1963, and the rest of it by the end of February, 1964.

Editor's Note: This is the fifth in a series of feature articles about the activities of other NASA installations. The information concerning Launch Operations Center and its facilities was supplied by the LOC Public Information Office at Cape Canaveral.

The **SPACE NEWS ROUNDUP**, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Robert R. Gilruth
Public Affairs Officer John A. Powers
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Honorable James E. Webb
 Administrator
 National Aeronautics and Space Administration
 New Federal Office Building
 Washington 25, D. C.

Dear Mr. Webb:

My recent visit to the space program centers at Huntsville, Cape Canaveral, Houston, and St. Louis was indeed a memorable one and I am most appreciative of your efforts in making this such an informative and particularly worthwhile trip.

The briefings and equipment displays were uniformly excellent and were indicative of a great deal of planning, coordination, and hard work. Because of the outstanding presentations, I was able to gain a much better insight into the problems and the progress of our space program.

Please convey my thanks and word of commendation to all of those responsible for a well-organized, interesting, and most informative inspection tour.

Sincerely,
 (Signed) John F. Kennedy

Dr. Robert R. Gilruth, Director
 National Aeronautics & Space Administration
 Manned Spacecraft Center
 Houston 1, Texas

Dear Dr. Gilruth:

It is with a great deal of pleasure that I forward to you the enclosed copy of a letter from the President, regarding his visit to the Manned Spacecraft Center.

His satisfaction with what he saw and learned, and the manner in which it was presented, is shared by all of us from Headquarters who accompanied the President on his tour. I hope you will convey to all the NASA personnel at your Center my appreciation, not only of the contribution which they made to the success of this presidential inspection tour, but for the outstanding effort which they are making to the success of our national determination to achieve pre-eminence in space.

With good wishes,

Sincerely yours,
 (Signed) James E. Webb

On The Lighter Side

From B. F. Goodrich Chemical Company comes word of a bull session among the technical lab people, whose imaginations are "sprinkled with stardust."

Among their celestial brainstormings on new product possibilities were the following ideas:

"Blaste Offe," a delicate vanishing cream which "vanished from drug counters quicker than we could count to zero."

"Capsule Capsules," tiny medicament capsules designed to save space in space capsules because the capsules took up so little space—only the designer kept losing them.

"Liquid Lift," a five-day pad deodorant for long countdowns, which never got off the ground.

"Canaveral Canapes," a jellied confection for those who can't stop to eat because they must go out to launch.

"After this," says the release, "we gave up—which proved to be the only intelligent thing we did that day."

EDITORIAL EXCERPTS

Houston Post
 November 8, 1962

PROBE BLASTS WILL BE SET OFF ON MOON

Scientists are planning to set off explosions on the moon to find out what it's made of, at least to a depth of 500 feet.

The explosives and devices to record the shock-wave reflections from various materials in the lunar crust may be sent to the moon aboard an upcoming unmanned Surveyor spacecraft, or the experiment may be delayed until men land on the moon.

Francis E. Lehner of California Institute of Technology's seismological laboratory and Dr. Robert L. Kovach of Cal Tech's Jet Propulsion Laboratory said Tuesday they are developing a 50-pound moon-blast package for the National Aeronautics and Space Administration.

Analysis of waves from a series of small blasts, they said, would help moon travelers detect lunar caves "which they might require for protection against meteoritic bombardment or caves containing ice that could offer water in addition to protection."

Cal Tech said "knowledge of the moon's surface and composition is of special significance to scientists. The moon may hold the key to questions about the early history of the earth and solar system because it probably has been virtually unchanged since it was formed."

WELCOME ABOARD

Manned Spacecraft Center acquired 60 new employees between October 22 and November 18.

Gemini Project Office: Victor P. Neshyba, John C. Ballinger, and Stephen M. Andrich.

Apollo Project Office: Clayton C. Knago, Don G. Phillips, Barbara H. Augelli, Pat M. Kurten, William H. Taylor, John W. MacAfee, George J. Clegg (White Sands, N.M.) and Marjorie A. Pellman, (Downey, Calif.).

Resident Office, White Sands: Rosella M. Telles, Joseph L. Evans, and Gerald F. Ard.

Spacecraft Technology Division: Paul D. Smith.

Space Environment Division: William E. McAllum.

Crew Systems Division: George E. Ruff.

Systems Eval. and Devel. Division: John R. Day, Raymond McCausland, Saverio Gaudiano, Gilbert J. Drab, William K. Roberts, and Orvis E. Pigg.

Preflight Operations Division, (Cape Canaveral): Agnes S. Hough.

Flight Operations Division: James E. Burkett, Robert W. Becker, Bailey L. Corbett, Ernest M. Fridge, Maureen E.

MSC PERSONALITY

Personnel Chief Stuart H. Clarke Began Career With Missile Agency

A business administration graduate who has been in personnel work and in Federal service since the beginning of his career, Stuart H. Clarke is presently chief of MSC's Personnel Division.

He is responsible for coordinating, directing, and supervising the activity of the division. In addition to the hiring and keeping of records for the Center's rapidly expanding personnel force of 2,400 employees. Personnel includes recruiting, placement, position classification, employee-management and contractor-employee relations, employee development and training, incentive awards, manpower utilization and related clerical and administrative functions.

There were far fewer personnel when Clarke joined MSC (then Space Task Group) at Langley AFB, Va. on July 23, 1961.

He was born in Stamford, Conn. on November 9, 1924 and graduated from Stamford High School in 1942. During World War II, he served with the U. S. Army Signal Corps from February, 1943, through February, 1946, as a cryptographer.

Returning to civilian life in March of 1946 he entered the University of Bridgeport, Conn. the following fall and received his BS degree in business administration in 1951.

Following graduation, he entered the Federal service at Aberdeen Proving Ground, Md. as an employee utilization representative.

On February 1, 1956, the day it was formed, he joined



Stuart H. Clarke

the personnel staff at the Army Ballistic Missile Agency as chief of the Employee Utilization Branch. From May, 1958 through April, 1960, he served as deputy director of personnel for ABMA, and was promoted to director of personnel in April, 1960.

He held this position until assuming his present duties with MSC in July of 1961.

During his first two years with ABMA, the personnel force grew from the initial 1500 employees to a work force of 4,600 people. It included the Von Braun team of rocket scientists which was later transferred to Marshall Space Flight Center where the Saturn launch vehicle is under development.

Clarke's awards and honors include the Sustained Superior Performance Award and Outstanding Performance rating in May of 1958, January of 1960, and again in June of 1961.

He is chairman of the board of Civil Service Examiners for MSC; a member of the Society of Personnel Administration and of Toastmasters International; vice president of the NASA Employees Benefit Association; and a member of the President's Advisory Committee for the University of Houston.

He is married to the former Doris Mae Hartung of Baltimore, Md., and the couple has two children—Stuart, Jr. 15, and Deborah Lynn, 11. The family lives in southwest Houston.

Church and scout work occupy a high place in Clarke's leisure time. He is an assistant scoutmaster, and says he and his son "went through the ranks together" in scouting, receiving their Eagle ratings at the same time. Fishing and water skiing have long been popular sports with the Clarke family.

Clarke's other avocation is bowling. He is an active member of the Personnel Office team which bowls in the NASA-MSC League. "In fact," he says with pardonable smugness, "we're on top of it."

Bowen, Mildred E. Young, and James E. Deming.

Flight Crew Operations Division: George L. Bosworth, John L. Mire, and James B. Thomas.

Computation and Data Reduction Division: Jackie L. Fisher, Daniel C. Kennedy, Hugh O. Wallace, Michael C. Parker, Nick A. Tzaperas, and Arturo T. Lozano.

Instrumentation and Data Systems Division: Richard T. Walter.

Personnel Division: Delores A. Stacks.

Security Division: Beth S. Gatchell and Mary Ann Ray.

Financial Management Division: Barbara L. Bettison, Loretta J. Poston, Harriett A. McRay, and Mary L. McComack.

Safety Office: Lois R. Westler.

Technical Services Division: Gordon S. Miller, Walter R. Wilson, Fred D. Rowell, and Welton A. Redding.

Technical Info. Division: Robert L. Phelps, and Charline Woodsmall.

Logistics Division: Thomas G. Tubbs.

Cape Canaveral Administration: Edward John Hogan, and Lucile N. Yannotta.

FCU Directors Vote In Savings, Loan Insurance

Both life savings insurance and loan protection insurance become effective for MSC Credit Union accounts next Saturday.

Life Savings insurance means that if a share-holder who has money invested in the credit union dies, the Credit Union matches the amount of his savings up to \$2,000 and turns the double amount over to his survivors or to his estate.

Loan protection insurance pays loans in any amount up to \$10,000 plus interest up to six months on death of the borrowers except those secured by real estate mortgages. (The MSC Credit Union does not accept loan applications secured by real estate mortgages.)

Exceptions to these insurance coverages, according to Credit Union manager Joseph Murray, include the following:

Those with savings accounts, whose accounts were opened after they themselves were aware that they had an incurable disease, would not be covered under life savings insurance.

A member who takes out a loan while in the hospital is not covered by loan protection insurance until he returns to work.

The MSC Board of Directors voted in both types of insurance at the November meeting on the basis of a straw vote which showed 92 per cent of 173 ballots returned in favor of loan protection insurance, and 81 per cent in favor of life savings insurance.

Members of the Langley Credit Union who have savings there are urged to transfer their account to the MSC Credit Union after the first of the year. The latter time stipulation is in order than present members of the Langley union will be able to receive any declared dividends for 1962.

Those desiring to transfer loan payments to MSC's Credit Union must first join it, then secure approval on a loan here to cover the unpaid balance of the loan at Langley.

Forms for initiating transfer of accounts will be available at the MSC Credit Union office by January 1.

Image Instruments To Develop Scan Converter For TV

Image Instruments, Inc. of Newton, Massachusetts will develop a scan converter for studying alternate television techniques to be applied in transmitting slow-scan television from spacecraft to standard home television receivers. Award of the development contract from the MSC was announced by Lester C. Smith, president of Image Instruments.

Rector

(Continued from page 1)

He spent the six years before joining MSC with General Dynamics/Astronautics, and has been concerned with the Apollo program since September of 1960. At that time he was assigned as project leader for preparing the proposal to NASA for the six-month study contract on Project Apollo. He prepared schedules and a program management plan as well as directing all technical efforts.

In November of 1960 General Dynamics Astronautics was awarded the study contract and Rector continued as project leader for this phase, supervising a staff of nine engineers and 90 technical employees. He managed the analytical and design work, development plan, manufacturing plan, and reliability and cost studies. In addition, he coordinated the overall study and chaired and participated in the three oral presentations made to NASA during the study.

In July of 1961, Rector was invited by MSC (then Space Task Group) to act as panel member and to critique papers presented at the Apollo Industry Conference in Washington.

During August through October, 1961, he directed all technical design efforts on the astronautics proposal for the Project Apollo spacecraft and participated in the oral presentation made to NASA in October. He was promoted to assistant project engineer at that time.

Rector joined MSC the following March.

IMCC Bids

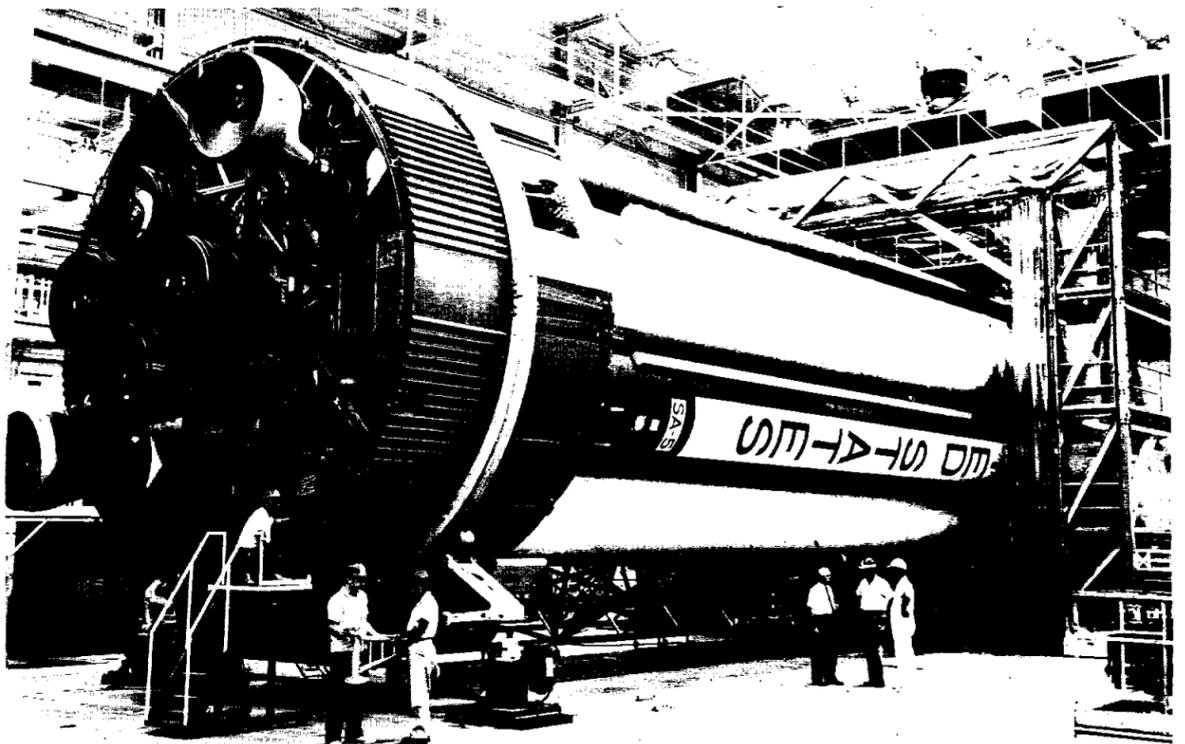
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industry systems for more details.

Western Electric performed a similar task for NASA in the Mercury program at a cost of \$80 million, but officials expect this contract to be less costly since in many cases modification of existing facilities will be the main requirement.

"NASA will use this scan converter for evaluating the visual effect of displaying at standard television rates those incoming signals which have been taken at a variety of different line and frame rates," asserted Smith. "By applying three cathode-ray charge storage tubes in a time-sharing fashion, we will eliminate flicker and smear in the display. Incoming signals will vary from five frames per second to 25 frames per second and 100 lines per frame to 525 lines per frame."

The purpose of this Image Instruments scan converter is to assist NASA design engineers in making the most suitable compromise between achieving high quality pictures for broadcast television and selecting optimum size, weight and bandwidth parameters for space environment television equipment.



BASE OF SATURN C-1 dwarfs engineers and technicians working on it at Marshall Space Flight Center in Huntsville, Ala. This is SA-5, which will be the first C-1 tested with a live second stage. It is scheduled to launch a dummy Apollo spacecraft in the second half of 1963. Six of the eight 1.5 million pound thrust engines are shown.

Crater

(Continued from Page 8)

in diameter and 100 feet in depth. More than 10,000 cubic yards of crushed rock was ejected from this crater by the impact. In the ages following its formation, the crater was eventually filled to within six feet of the surface by accumulated sediments left by wind and water.

It now appears as a shallow, nearly circular depression surrounded by a low, rock-butressed rim.

The Odessa crater is one of 13 proven craters scattered over the world, the largest of which is between Flagstaff and Winslow, Arizona, measuring 4,150 feet across and 570 feet in depth.

Three are in Australia, one in French-West Africa, one in Argentina, one in Estonia, two in Siberia and one in Kansas. The two in Siberia are the only two formed in this century, one in 1908 and the other in 1947.

EMR To Develop Gemini Data Transmission, Record System

A multimillion dollar contract has been awarded to Electro-Mechanical Research, Inc. (EMR) by McDonnell Aircraft Corporation. Under the contract EMR will supply spacecraft data transmission and on board recording systems and the associated ground checkout equipment for Project Gemini, the next major step in U. S. manned space exploration.

McDonnell Aircraft Corporation is prime contractor for the Gemini Spacecraft.

The spacecraft data transmission and recording system which EMR will supply will collect, record and transmit data regarding vital functions of the spacecraft and its two-man crew.

EMR equipment will relay the crews' reaction to long-duration space flight and internal and external spacecraft environment measurements to ground stations. It will also record and transmit data pertaining to the rendezvous and docking operations which will

Third Saturn C-1 Test Is 'Perfect' Say Heads

The third successful test of the Saturn C-1, held at Cape Canaveral November 16, was "perfect" on the basis of a preliminary data study, NASA officials said last week.

The 550-ton Saturn carried dummy second and third stages loaded with 95 tons of water on a five minute flight, the longest to date. It was the first test in which the eight first stage engines, generating 1.3 million pounds of thrust, had been fully fueled. Total fuel weight was 375 tons.

The flight ended as planned 104 miles up when a radio signal from ground control exploded dynamite charges that ripped the rocket apart. The deliberate detonation spewed 23,000 gallons of ballast water into the ionosphere.

A cloud of ice particles formed and spread to several miles in diameter, clearly visible to observers at Cape Canaveral.

Although the water was aboard to simulate the weight of the second and third stages, scientists hope camera and other tracking studies of the cloud will provide information on atmosphere physics. A similar cloud created by the destruction of the second Saturn last April, produced synthetic lighting when the ice particles rubbed together.

The engines shut off as planned two minutes and 27 seconds after blastoff and the inert giant coasted upward to its apex of 104 miles before destruction. Remnants of the shattered rocket continued to follow a ballistic course and dropped into the Atlantic 270 miles downrange.

One more test flight of the first stage with dummy second and third stages is planned, scheduled for next spring. In that test one of the rocket's eight engines will be shut off to determine capability with one engine missing.

The fifth Saturn flight will come later next year, using for the first time a live, liquid-hydrogen fueled second stage and generating for the first time the full 1.5 million pounds thrust. Beginning with the sixth Saturn launching, models of the Apollo spacecraft will be flown into orbit.

Flight number 11 in late 1964 or early '65 is expected to boost the first three-man Apollo crew into orbit around the earth for an extended stay.

By 1966 an advanced Saturn developing 7.5 million pounds of thrust is slated to hoist a three-man Apollo crew into orbit around the moon and return it to earth.



SPECIAL ASSISTANT Paul E. Purser cuts the ribbon officially opening the Odessa Meteorite Museum, as Tony Rodman (left), president of the Odessa Meteoritical Society and Emil Beck (right), secretary-treasurer, look on.

NASA Studying Meteorite Danger, Says Purser At Opening Of Museum

"The crater and meteorites you are preserving here in Odessa are one of the few isolated examples of a heavy bombardment of the earth that takes place every day," Special Assistant Paul E. Purser said at the dedication of the Odessa Meteorite Museum November 14.

Purser's speech was given at a luncheon for 300 in the ballroom of the Lincoln Hotel in Odessa.

It followed ceremonies in which he cut a ribbon to officially open the Odessa Meteorite Museum, built on the edge of a giant crater eight miles southwest of Odessa on U. S. Highway 80.

"Both the crater and the collection of meteorite materials to be found in this museum have an immense scientific value. I think this is a fine step for the people of Odessa to take," Purser said in cutting the ribbon.

"Most particles from space are so small they burn up as shooting stars before they reach the ground," Purser added later, "However, they constitute a definite threat to the safety of future astronauts in the space program of the United States."

He added that outside the atmosphere, meteoroids are blind missiles of destruction hurtling through the vacuum at speeds above 40,000 miles per hour. "For this reason, a vital part of the United States space research is devoted to the study of meteoroids and their possible effect on spacecraft."

Purser discussed the origin of the bodies and their penetration power, listing current theories including the idea that comets contribute 90 per cent of those meteors which actually strike the surface of

the earth. "A smaller portion, like those which fell near Odessa, are more solid substance and must have a different theory for their source," Purser said. The most popular idea about their origin is that they were part of a large body involved in a collision many eons ago, he explained.

According to this theory, fragments from the Odessa crater are not unlike the material scientists believe exists in the center of the earth.

Although particles in the micrometeoroid range do present a minor problem to spacecraft, he said, "the greatest area of concern at the present time is the meteoroids in the intermediate size range on which present satellites and ground observation techniques can gather little information.

"When a meteoroid punctures the spacecraft there will always be the problem of sealing the hole to prevent the precious life environment inside from leaking into space."

Purser said heavy plastic was now under study by NASA to determine if it has the necessary self-sealing properties.

He concluded his speech with a summation of the past

The name of what was formerly Life Systems Division, headed by Dr. Stanley C. White, has been changed to Crew Systems Division. The name change was approved by NASA Headquarters October 3. Two other division titles have also changed: the old spacecraft Research Division is now Spacecraft Technology Division, and the old Space Physics Division is now Space Environment Division.

accomplishments and future plans of this country's space program.

The Odessa crater was formed in prehistoric times when a great shower of nickel-iron meteorites collided with Earth. Geologists estimate the time of the fall was about 20,000 years ago. The meteorites numbered in the thousands and fell over an area of about two square miles. Most of them were small but several large ones struck the Earth with enough force to penetrate deeply into bedrock and shatter with explosive force.

When freshly formed the craters were funnel-shaped depressions, the largest 550 feet

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SECOND FRONT PAGE

U. S. Must Decide What Comes After Moon Quest, Says Dryden

Administration policy-makers must decide relatively soon what space task to take up next after manned landing on the Moon and at what point it should be introduced into the U. S. program, Dr. Hugh Dryden, deputy NASA administrator told the American Rocket Society in Los Angeles last week. Dryden said thought is being given to Mars and Venus flights or a manned lunar colony. But, speaking for himself, NASA's top scientist said he favors developing a manned orbiting space station

Whatever the choice, however, it is "one of the major national decisions of the near future." Costs will be high for the new project. "The costs of the presently approved program increase next year to about \$6 billion if current time schedules are maintained," Dryden stated. This makes it doubtful that the undertaking will be pressed within the next year or so.

If early lunar exploration returns "surprises" in the form of natural resources of use on earth, Dryden said he might change his view that the space station should, logically, be introduced next into the space program. The space station would enable scientists to conduct a wide range of experimentation, could enable space assembly of spacecraft and larger space stations. "Most deep-space missions could be conducted most efficiently by using the space station as a staging area," he said.

Dryden's main point was that the Apollo program, with all the technological, engineering and intermediate flight experience that it promises, will leave the U. S. with a national capability to accomplish many other space mis-

sions. To take advantage of developments, therefore, planning for later missions must begin soon, Dryden indicated.

In the same vein, Dryden spoke of unmanned future scientific missions "requiring still larger launch vehicles such as the Saturn and Advanced Saturn." Larger launch vehicles would remove many current restraints on the weight and complexity of scientific equipment and on-board power available. "Thus an orbiting astronomical observa-

(Continued on Page 2)

A coffee get-together for NASA men between the ages of 21 and 35 will be held in the Farnsworth-Chambers Bldg., at 7:30 p. m. Wednesday, Dec. 5.

Guest speakers will be Gordon Mercer of 7938 Pecan Villas, president of the Houston Junior of Commerce and Russell Cummings of 1810 Portsmouth, past president.

The coffee, sponsored by the Jaycees, will be to inform young men of NASA of the advantages found in Houston and of the work Jaycees are doing in the community, Mercer said.



LATEST ADDITION to Manned Spacecraft Center's temporary sites is the former Veteran's Administration building at 2320 LaBranch near the downtown area of Houston. The building will be ready for occupancy in December. It will eventually be the new home of Gemini Project Office, Gemini Procurement, and in the future of the Reliability and Flight Safety Office.